



### D.3.1 PLOT Persuasive Learning Design Framework

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# Deliverables Report

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## **Executive summary**

This deliverable is the first of three deliverables in WP3: Persuasive Learning Design Framework, and will serve as the basis for the future work of mapping persuasive principles to learning activities, to be reported in D.3.2 and for the development of Persuasive Learning Designs, to be reported in deliverable D.3.3.

This document is structured as follows: in section 1, we present the basics of Persuasive Design. This section is to be understood in connection with presentations given at the consortium meetings in Leeds and Aalborg, and in connection with the subsequent discussions. In section 2, we offer examples of central issues in learning theories can be aligned with persuasive efforts as seen from a rhetorical point of view. In section 3, we continue the work of defining intersections between persuasion and didactics, where more specifically oriented towards the notions of kairos, constructive alignment, and towards a common understanding of the ethical stances we believe should underpin persuasive efforts. In section 4, we present viewpoints on the four cases, central to the PLOT project. This section is the result of a workshop held at the consortium meeting in Aalborg. Finally, in section 5, we make some remarks on the path towards the next deliverable.

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## **1. Persuasive Design – An Overview**

The following section holds a brief introduction to the theoretical foundation of Persuasive Technology and Persuasive Design. In the description of Persuasive Design a selection of human centered perspectives are included in order to explain some of the challenges related to the deeper understanding of the field. The selected perspectives also form the basis of the determination of cross fields between persuasion and learning.

Persuasive Design as a research field, is founded in the novel field of Persuasive Technology, and aims to explore and develop the notion of designing interactive computer technologies with endogenous intentions to change the attitude and/or behaviour of the user.

## 1.1 Persuasive Technology

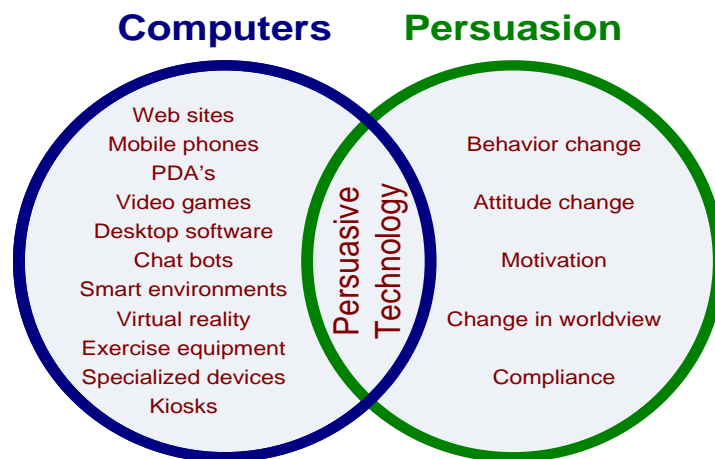
The field of Persuasive Technology was established by the American researcher BJ Fogg, who during his PhD in 1993 initiated the preliminary studies of computers as persuasive agents. In 1998 he published his first paper on the subject (Fogg 1998), and in 2003 his research culminated in the publication of the book *Persuasive Technology – Using Computers to Change What We Think and do* (Fogg 2003).

Based on a background in social psychology and HCI, Fogg described how computers could in fact be considered social actors, and how theories regarding social influence and persuasion could be considered in a digital perspective.

Fogg defines a Persuasive Technology as:

*“Any type of interactive computer technology designed with the intent to change people’s attitudes or behaviour, without using coercion or deception”*

(Fogg 2003).



**Figure 1- Persuasive Technology - the cross-field between persuasion and interactive computer technologies**

Figure 1 visualises how Persuasive Technology is defined as the cross field between the social psychologist concept of persuasion, and the field of interactive computer technologies. Fogg emphasises that only interactive technologies can be considered persuasive, as it is through the interaction between the user and the technology that the technology may constitute the role of a social actor.

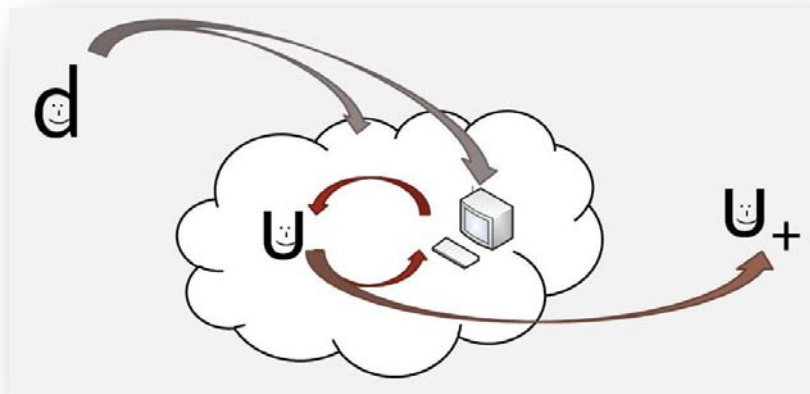
In relation to the actual concept of persuasion, Miller argues that in order to gain an in depth understanding of the concept, it may be beneficial to distinguish between three different behavioural outcomes which are commonly served by the persuasion process (Miller 2002). Miller makes the distinction between persuasion as a shaping process, a reinforcing process and a changing process, and argues that this distinction is vital not only to the perception of the concept of persuasion, but also to the process of designing a persuasive action – one must clearly define the persuasive outcome in order to successfully plan the persuasive initiative. In acknowledgement of Miller's definition of persuasion as being more nuanced than simply changing an attitude, we approach Persuasive Design based on the following definition:

*“Any type of interactive computer technology designed with the intent to create, reinforce or change people’s attitudes or behaviour or both”*

(Schärfe 2010)

Another important consideration with regards to Fogg’s definition of Persuasive Technology is that the perception of technologies as holding endogenous intentions, as well as the disregarding of exogenous intention may be considered problematic. By his definition of persuasive technologies, Fogg stresses that the field of Persuasive Technology focuses upon endogenous or *built in* persuasive intentions alone, and that the persuasive intention is a core element of the design. However, this perspective is problematic for several reasons.

The designer will most often have a specific intention with the design of a technology, but this intention is often more complex than “wanting to motivate people to quit smoking”, and the user’s intention towards applying a specific technology, must to some extent be motivated by exogenous factors. As a result, the notion of intention in relation to Persuasive Design also calls for an adjusted and more nuanced perspective (Gram-Hansen 2010)



**Figure 2 - The intention of a technological design concerns both the technology and the use context (Schärfe 2010)**

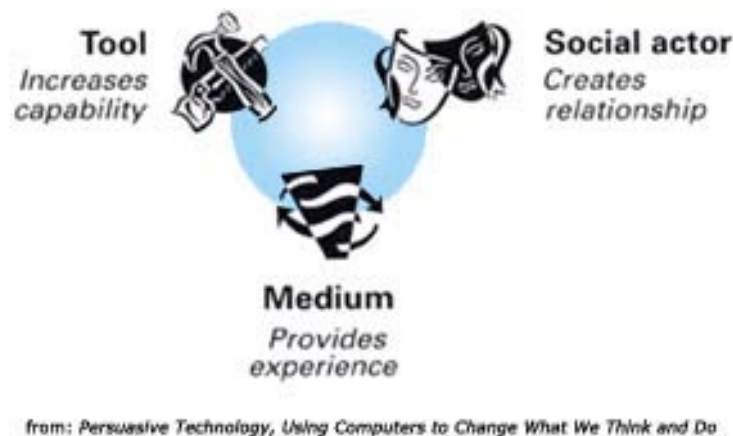
Figure 2 illustrates that the designer’s intention concern both the technology, and the context in which the technology is to be applied. The technology, whether this is a PC, a mobile phone or any other interactive device, holds a variety of capacities which may facilitate the designer’s persuasive intention. Once applied within the intended context, the user and the technology reciprocally influence each other, resulting in an alteration of the context and in the user being persuaded to change attitude or behaviour. The intention remains a human characteristic, whilst the technical capacity of the technology serves to support the fulfilment of the persuasive intention.

This adjusted perception of the intention, compared to the original definitions introduced by Fogg, emphasises the importance of considering the context when designing persuasive technologies. In order for a persuasive intention to be successfully met, there must be an appropriate balance between the endogenous intention of the designer and that which motivates the user to apply the technology.

Designers are limited to conceiving the intended use of a technology, with no means to assure that the practical use will correspond. Once a technology is put to use, its employment as well as the users perception of the endogenous intention, is influenced by the context in which it is applied. When applied within the appropriate context, a technology may prove itself to be a highly efficient persuader, but if applied without consideration of the context, the Persuasive Design could fail to fulfil its persuasive goal, or be considered unethical (Gram-Hansen 2010).

According to Fogg, Persuasive Technologies have the ability to change attitudes and behaviours on two levels: macro and micro. The distinction between the two is important in terms of both analysis and development of persuasive designs in most computer technologies. The term Macrosuasion describes an overall persuasive intent of a technology, whilst Microsuasion refers to the use of Persuasive Design principles in technologies which do not necessarily have an overall persuasive goal (Fogg 2003).

In order to apply a more practical approach to the persuasive abilities of computers, Fogg introduces the Functional Triad, in which he identifies three different roles that a computer may fill whilst acting as a persuader.



**Figure 3 - The Functional Triad**

Fogg argues that a persuasive technology may function as a tool, a medium for simulation or as a social actor. For each of these roles Fogg designates a list of persuasive principles, which – if implemented and executed in accordance with the appropriate time and place, will result in a persuasive technology (Fogg 2003):

Role	Ability	Principle
Tool	Making target behaviour easier to do Leading people through a process Performing calculations or measurements that motivate	Reduction Tunnelling Tailoring Suggestion Self-monitoring Surveillance Conditioning

Medium Social Actor	Allowing people to explore cause-and-effect relationships Providing people with vicarious experiences that motivate Helping people rehearse a behaviour	Simulation
Social Actor	Rewarding people with positive feedback Modelling a target behaviour or attitude Providing social support	Social signals

Fogg does not present The Functional Triad as a design method as such, but considers it an overview of the different persuasive strategies which may be executed by a technology. As a result, it is often emphasised that in relation to specific design cases, it is often beneficial to focus on a select few principles rather than attempt to implement all nine into a technological design.

All 9 persuasive principles of the Functional Triad are exemplified briefly in the following table:

Persuasive Principle	Explanation
Reduction	<i>Reduction</i> refers to the design strategy of simplifying what would otherwise be a complex process. E.g. Amazon's 1-click purchase which lets you skip a lot of time consuming navigations and tedious form filling, in order to make an instant purchase
Tunnelling	<i>Tunnelling</i> is a design strategy which places the user inside a process that has a pre-determined direction. E.g. most installation processes require that the user completes several steps before the installations process is completed.
Tailoring	<i>Tailoring</i> is the degree to which a site or a program presents relevant content to individual users or user groups. Navigational options, filtering mechanisms and labelling systems can all be adapted to reflect user demographics.
Suggestion	<i>Suggestion</i> is the persuasive design strategy of delivering a message at the opportune moment. E.g. when Amazon suggests extra books which are closely related to the one you were just about to buy.
Self Monitoring	<i>Self-monitoring</i> is the design strategy which allows you to monitor progress. E.g. sites which require a log-in and then enables the user to monitor the progress of weight loss.
Surveillance	<i>Surveillance</i> is closely related to self-monitoring; however the monitoring is not done by the user but by the system or the owners of the system. E.g. when using a weight loss website, users may be motivated not only by monitoring their own progress, but also by sharing experience and receiving feedback from other users who are struggling with similar issues. By sharing statistics, diet-plans etc. users feel more related to each other and may be inspired by actions taken by others.
Conditioning	<i>Conditioning</i> refers to the strategy of embedding emotional feedback into a design. It is often expressed as praise and rewards, but in a slightly more subtle manner than be the case with <i>Persuasive Social Actors</i> . E.g. when forums reward users with increasingly lofty titles (or user rights) in correlation to the number of posts made by the user.



Simulation	Simulation is a design strategy which enables the user to explore and experiment in a safe, nonthreatening environment. It shows a link between cause and effect clearly and immediately, and may appear as a subtle type of persuasion, as the user builds personal experience through the simulation
Social Signals	Social signals is the type of design principles which – like conditioning embeds emotional feedback into a design, but which may be considered more direct. E.g. rewarding users with positive feedback and providing social support. Examples of persuasive social actors are the chat bots which are seen on websites such as SAS and IKEA, where the computer gives advice and feedback in a human like manner. Social signals also include the impact of physical attractiveness.

Fogg's approach to Persuasive Technology is as mentioned based on social psychology, and the ideas presented in the textbook from 2003 are focused on uncovering the abilities of persuasive computers, rather than actual suggestions as to how Persuasive Designs should be created in practice. Other researchers have since then presented highly qualified suggestions regarding more development based conceptualisations of persuasive principles. However, one of the greatest challenges of Persuasive Technology – the ability to accurately estimate the appropriate time to initiate a persuasive principle - has yet to be overcome (Gram-Hansen 2010).

## 1.2 Persuasive design in a Human Centred Perspective

In exploration of the notion of persuasion, and in the aim of extending the theoretical foundation of Persuasive Designs, Centre for Computer Mediated Epistemology at Aalborg University approaches the challenges of this novel field from a foundation in classical humanistic traditions such as rhetoric, logic and ethics. To a great extent, focus is aimed at the development of theory and methodology which will facilitate and improve the relatively newly established research area, and we refer to our particular approach as Persuasive Design.

The very idea of persuasion is commonly considered as having been brought into the world by classical rhetoric. In the 2003 textbook, Fogg made reference not only to the ideas presented by Aristotle, but also to the rhetorical notion of Kairos which may be defined as *the opportune moment* to perform a persuasive action. Modern studies of persuasion are naturally influenced by other disciplines too, notably social psychology, anthropology, marketing and advertisement studies, usability and IT design etc. None the less, the field of Persuasive Design may still benefit from perspectives introduced by rhetorical theory, modern as well as classical (Hasle 2007)

Classical rhetoric has been systematically related to social psychology by Michael Billig (Billig 1996). A central statement in Billig's *Arguing and Thinking*, is that we may gain significant insight into human perception by exploring argumentation and especially by studying what classical rhetoric has to say on the subject. Billig observed that social psychology had had a tendency to identify thinking with rule-following. From classical rhetoric he learned, however, that while arguments and thought may well be based on rules, rules themselves arise from arguments, and indeed, may be disputed by arguments. That is to say that while rules do exist, they are not deterministic. One should not rely on the assumption that following certain rules will always yield the desired results (Hasle 2007; Pertou 2009).

Besides from providing insight to the notion of persuasion in general, the field of rhetoric also offers valuable input in terms of key terminology and concepts which are vital when designing and

developing persuasive technologies. Amongst these concepts is the previously mentioned notion of Kairos.

Kairos is often described as timing, or the ability to perform the appropriate action at the right time and in the right place. In term of appropriate, the performed action is required to be not only effective but also ethical. The concept sums up the principle that any rhetorical approach is based upon the specific situation, and that comprehension of the context as such is one of the most vital resources when deciding upon rhetorical means to apply to a given argument (Hansen 2009) Hansen specifies that the definitions of Kairos vary from narrow translations such as “particular point in time” and “specific circumstance”, to wider concepts such as “situation”, “occasion” and “opportunity”.

The narrow translation of Kairos is easily related to the rhetorical concept of Aptum, and is as such more applicable to the specific communicative situation. The wider definition however, contributes to the understanding of the ontology of rhetoric, as it clarifies the fields influence upon the world. Not only does rhetoric construct situations with an epistemological potential, it also shares a connection with the concept of doxa (unwritten rules or joint conviction), thereby relating Kairos to practical knowledge and experience, in contradiction to knowledge in the philosophical sense.

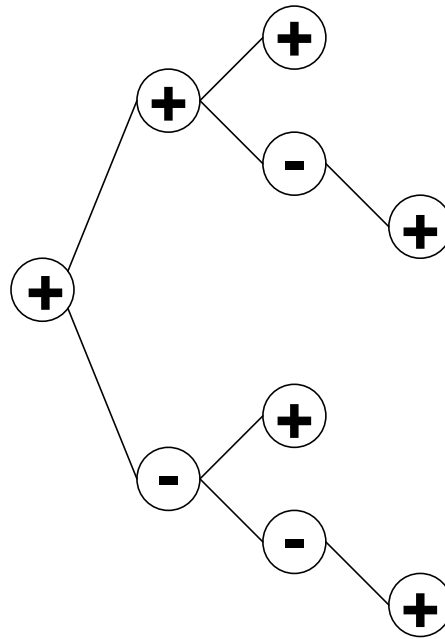
When considering the different meanings of Kairos in a Persuasive Design context, the narrow definition serves well in relation to specific design related choices, such as determining the appropriate time for initiating a persuasive strategy (i.e. triggering a specific behavior), an argument which has been raised by several researchers over the years (Glud and Jespersen 2008; Aagaard 2008) The wider definition on the other hand, supports the argument that in order to successfully select and apply a persuasive principle to the design of a technological device, the designer must beforehand acquire a fundamental understanding of the context in which the device is to be applied, and use this knowledge to create a technology which will be appropriate to the given situation.

### 1.3 Kairos in a technological context

Kairos in itself is a powerful and multifaceted concept which is not easily formalized. As such, even though Kairos is vital in relation to successful persuasion, the concept in itself does not translate easily to the digital context of persuasive technologies. However, the challenges related to integrating the notion of Kairos in the development of interactive technologies, may be addressed by considering Arthur Priors perspectives on temporal logic. More specifically, the development of Persuasive Designs may benefit greatly from Priors arguments that time is not only a specific moment but also a wider contextual concept, which he distinguished between as A-time and B-time

Prior notion of B-time refers to the objective perception of time, which has dominated the philosophical and the scientific debate for centuries and which is expressed by for instance traditional calendars. A-time on the other hand refers to the contextual perception of the present moment, and takes into consideration the unbalances which are caused by previous events (Øhrstrøm 1995).

Kairos as it is described by Hansen, may be related to A and B time, by considering Priors notion of A-time as the formalization of Hansen’s wider definition of Kairos, whilst Priors notion of B-time may be related to Hansen’s narrow definition of the concept.



**Figure 4 - Time tree visualising a systematic sequence of events. + indicates that the users has performed a positive action, - indicates a negative action.**

The visualisation in Figure 4 illustrates a systematic sequence of events, in which a person goes through specific processes in order to get from the beginning of the program to the end. This could be a computer system in which the user completes individual steps in order to accomplish a greater goal. As such, B-time is related to the complete process, providing an overview of the steps to be completed, whilst A-time is related to the individual moments in the process where the context changes and the system must adapt to new circumstances.

To exemplify this even further, the computer system described above, could be a system designed with the intention to motivate the user to quit smoking. As such, the intended outcome is dependant on process which the users must go through, during which the user will find himself in situations where the system must motivate the continuous process towards the set goal. First intermediate aim could be to not smoke during lunch break. If this is accomplished, the system may praise the user for the display of willpower, and contrary if the intermediate aim is not achieved, the system may motivate the user to try again during the next customary smoking break. In the given example, praise from the system will only be contextually appropriate if the user does in fact abstain from smoking.

The importance of considering not only Kairos but also Prior's notion of A- and B-time in the development of persuasive systems, is elaborated upon even further by Louise Glud and Julie Jespersen, in a conceptual analysis of Kairos in relation to location based services. They conclude that inclusion of Kairos in the development of mobile persuasive technologies is spatiotemporal and demand that all conceivable time dimensions are taken into consideration (Glud and Jespersen 2008)

The different perspectives of Kairos presented by Hansen are inseparable in the respect that both must be taken into consideration when determining the appropriate moment to initiate a persuasive action. Likewise A- and B- time cannot be considered as individuals, but must both be taken into account when designing persuasive systems. In order to fully conceive the notion of appropriate timing, one must include both a broader understanding of the defined aim of the process, and consider the contextual reality of the user whilst the steps of the system is being completed (Gram-Hansen 2010).

## 1.4 The ethical dimension

Besides from addressing the importance of appropriate timing of persuasive initiatives, Kairos also emphasizes the importance of ethical reflections in the design process. The acknowledgement that persuasion must take place in an appropriate manner, does not only refer to selecting the principles to implement in a system, but also to a general understanding of the context in which the technology is to be applied. As a result, this final part of the introduction to Persuasive Design will address some of the challenges related to ethical evaluation of persuasive technologies, and describe the initial steps taken towards an approach to ethical evaluation which takes the contextual dimension of Persuasive Design into consideration.

As previously mentioned, Fogg defines persuasive technologies as computer systems which persuade without using coercion or deception (Fogg 2003). The definition indicates that there is a very thin line between persuasion and manipulation, and that ethical evaluation is an important aspect of the development process. However, the definition is also highly problematic from an ethical perspective, as the perception coercion and deception is in fact contextually dependant. That which is deceptive in one context may nointert be considered as such in another, and that which is considered completely ethical in one use scenario may be considered highly unethical in another.

In order to address these challenges, steps have been taken towards a three dimensional approach to ethical evaluation, which considers not only the consequences of the technology but also the intention and the use context. This has resulted in the paper *Towards a Context Oriented Approach to Ethical Evaluation of Interactive Technologies*. The paper has been submitted to Interact 2011 and includes the following section concerning the ethical evaluation of persuasive and interactive computer systems

*“Traditionally, ethical reflections are approached from one of two philosophically opposite perspectives: The utilitarian approach which evaluates an action by its consequences and the deontological approach which relates to the ethical duty of the actor and seeks to construct rules and maxims by which the actors should abide. Unfortunately, neither of these approaches appears individually sufficient in the evaluation of interactive technologies, as none of the perspectives include contextual considerations.*

*Commonly used approaches to ethical evaluation of technologies such as the ACM Code of Ethics, tends to place the primary responsibility of applying a technology, on the designers and developers, thus discarding the responsibility of the users who apply the technology. Contrarily, Albrechtslund argues that designers, are limited to conceiving only the intended use of a technology, but have no way of ensuring that the actual use will resemble their intentions. Once a technology is developed and handed over to the users, the perception of both the technology and the intended use is*

*influenced by the context in which it is applied and the social reality of the users. In fact, the usage more often deviates from the original intention, making it inequitable to hold the designers solely responsible for the consequences of a technology (Albrechtslund 2007; Gram-Hansen 2010).*

*However, the acknowledgement that the designer is unable to foresee all possible use scenarios should not be interpreted as an excuse for the designer to disclaim responsibility for unethical use of a technology. Contrary, once aware that the technology may potentially affect users far beyond the intended aim the designers should more than ever be aware of the reciprocal responsibility which emerges between themselves and the users - and as such, ethical evaluation should be initiated from the very beginning of the development phase, whilst the notion of the technology is matured and explored (Gram-Hansen 2010). Put to practice, the ethical evaluation of interactive technologies should include both deontological and utilitarian perspectives– in spite of the fact that these perspectives are philosophically opposites.*

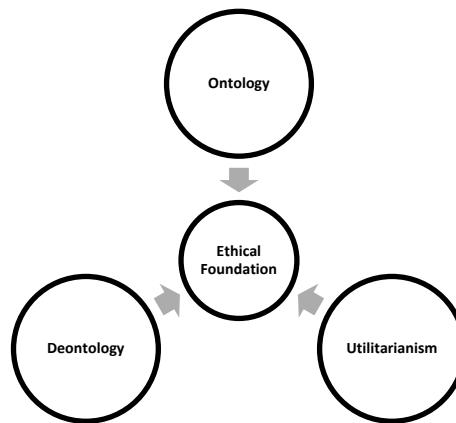
*When considering the visualisation in Figure 1, the deontological perspective is primarily related to the designer and the intended use of the interactive technology (d), whilst the utilitarian perspective relates to the consequences of the technology being applied in a given use context (U+). As such, both the deontological perspective and the utilitarian approach to ethical evaluation must be considered when evaluating interactive technologies. However, with technologies being applied globally and cross culturally, the contextual perspective must be taken into similar consideration in the evaluation process, and neither the utilitarian nor the deontological viewpoints provide a sufficient theoretical foundation for this third and vital dimension.*

### **Applying Løgstrup as a contextual perspective**

*In the process of defining a theoretical foundation for ethical evaluation which is applicable throughout the entire design process, the reflections and perspectives presented by the Danish philosopher and theologian K.E. Løgstrup may be a significant contribution to the previously described combination of utilitarian and deontological perspectives.*

*Løgstrup finds that ethics, rather than being based on reason, is founded in what he calls sovereign expressions of life, which includes benevolence, open speech, trust, love and compassion – in other words human features that are generally considered ethical. He furthermore argues that we are born into ethics as a result of the dependency which exists between humans. As soon as humans interact, they influence each other's lives, and it is by interaction that ethics and ethical responsibility emerges. Humans are inevitably entangled, and must be willing to acknowledge responsibility for the impact we have on each other's lives. Just as we are able to enrich the lives of one another, we are also able to inflict terrible damage to each other, and as such we must recognize and comply with the power structure which exists between us (Løgstrup 1997; Gram-Hansen 2009).*

*Furthermore, Løgstrup stresses that the perception of ethics is based on the contextual reality of the individual, i.e. ethics is considered an intuitive result of human nature, rather than moral rule based on reason, and the distinction between ethical and unethical actions are dependent on the specific situation and the social reality of the people involved in the interaction.*



*Figure 3 - A three dimensional approach to ethical evaluation*

*Adding Løgstrup's ontological approach to ethics as a third dimension to the previously mentioned collaboration between utilitarian and deontological traditions, supports the notion of a reciprocal responsibility between the designer and the user of a technology, perhaps even more so if considering the design of technologies a particular type of interaction in itself. In general, technologies of all types are designed in ways which indicate to the user how the technology is meant to be applied. Colours, shapes, buttons and icons all provide the user with information which – dependent on the user's previous experience with similar technologies, guide the user through technology employment. As such, the act of designing a technology can to some extent be considered a particular type of communication or even interaction between the designer and the user (Gram-Hansen 2009; Gram-Hansen 2010).*

*In this perspective, the designer becomes an active participant similar to the user who applies the technology. In accordance to Løgstrup's approach to ethics, the ethical responsibility is then shared between the designer and the user. The responsibility of the designers is apparent due to their role as creators of the technology, but the co-responsibility of the users with regards to the influence the technology has on them and the use context must not be undermined. The users' ability to apply technologies beyond ways which are foreseeable for designers, demand that the users' are to some extent held responsible for their own actions.*

*Considering Løgstrup in the ethical evaluation of interactive technologies is not unproblematic. Firstly because Løgstrup argues that the perception of the ethical action is based on the intuition and social reality of the person performing an action – making it impossible for others to evaluate the action. And secondly because the notions of ethics which are presented by Løgstrup originates from reflections concerning humans who are physically located at the same place thus sharing a common understanding for the characteristics which define the specific context. Being in the same place is no longer a necessity when interacting through technology, and when the interaction takes place between the designer and the user, they will most often not be found at the same place.*

*As a result, the ethical perspective presented by Løgstrup cannot stand alone in the evaluation of interactive technologies, but must be applied as a third dimension to the collaboration between utilitarian and deontological perspectives. Løgstrup's contribution serves as a support of the theoretical foundation with reflections regarding concepts which are as essential in interaction through technologies as they are for physical interaction between humans. In particular, Løgstrup*

*offers valuable philosophy concerning key concepts such as trust, credibility and interaction.”* (Gram-Hansen, Schärfe et al. 2011)

## 2. Notions of teaching and learning

This section holds an introduction to the theoretical perspectives on, didactics and learning which are estimated to be of particular relevance to the Euro PLOT project. In particular, attention is drawn towards reflections regarding *outcome based learning*, as well as the notion of *constructive alignment* as it is described by John Biggs and Catherine Tang (Biggs and Tang 2007). Furthermore, in continuation of the previous chapter's description of the cross field between Persuasive Design and classical rhetoric, this chapter identifies how rhetoric also shares specific commonalities with modern teaching.

### 2.1 Learning as a mutual responsibility

*"How effectively we teach depends first on what we think teaching is."*

(Biggs and Tang 2007)

According to Per Fibæk Laursen, that which separates teaching from other activities such as propaganda and indoctrination, is the particular intention of the teacher – namely that the students are to learn something specific. The distinctive characteristic of the intended learning scenario, is that the teacher wishes to motivate and encourage students to relate to and reflect upon the subject in a specific way. The aim is to make the students gain a deliberate and positive impression of the content of the subject, and to motivate an aspiration within the students to learn more. As such, teaching may be characterized by a double intention, i.e. the teachers intention to motivate the students intention to learn (Laursen 1999).

In modern western countries, we may add that we also strive towards teaching students to respond critically to the subjects and content they are introduced to, contrary to advertising companies and propagandists who strive towards noncritical acceptance.

Laursen's reflections on teaching and learning, are easily related to the levels of teaching which constitute part of the foundation for Biggs and Tangs approach to quality teaching at university level (Biggs and Tang 2007).

### 2.2 Outcome Based Learning and the notion of Constructive Alignment

Biggs and Tang refer to three different levels of teaching out of which the first two are blame models, first level blaming the student and the second level blaming the teacher. The third level integrates learning and teaching and considers teaching as motivating students to use the provided learning activities in order meet the intended learning outcome. With this third level of teaching Biggs and Tang relates their approach to teaching to the notions of outcome based learning (OBE) and constructive alignment (CA).

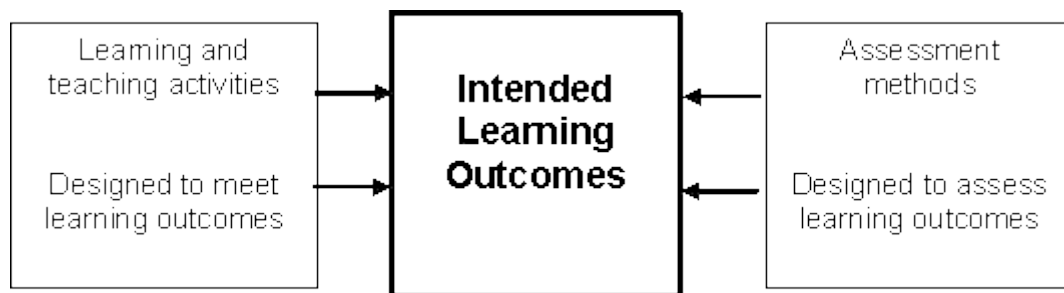
OBE is traditionally a teaching method which distinguishes itself by focusing on the student and by acknowledging that different students learn in different ways and may as a result require different styles of teaching. The notion of OBE has been implemented in a wide variety of ways which all share some commonalities. In order to explain the development in OBE, Biggs and Tang distinguish between three versions, and point these towards the notion of CA.

In the first version of OBE, the intendeds learning outcomes were made individually for each student, so that everyone would achieve some sort of success. Contrary, the second version defines



the intended outcomes at an institutional level, thereby comprising average student performances in order to meet the requirements of external stakeholders. In the final version, outcomes are defined to enhance teaching and assessment, not to serve any other purpose. The essential feature of this last version is that intended outcome statements are made out for each course and for each individual lecture within that course. Intended outcome statements are not lists of topics that the teacher will cover through a curriculum, they are statements explaining what needs to be recognized in order to determine if the students have learned that which is intended (Biggs and Tang 2007).

Biggs and Tang expand the notion of OBE even further, as they introduce the concept of CA. CA is constructive in the extent that it is based on the constructivist theory that learners use their own activities to construct knowledge (or other outcomes). The alignment reflects the notion that the learning activity in the intended outcomes, needs to be activated in the teaching if the outcome is to be achieved. If the intended outcome is to learn how to drive a car, focus should be placed on the activity itself, i.e. driving, rather than be focused on giving lectures on how to drive. Finally, the assessment should focus on how well the car is driven. In short, the teacher aligns the planned learning activities with the intended learning outcomes. (Biggs and Tang 2007).



**Figure 5 - Constructive Alignment**

As illustrated above, CA centers the intended learning outcomes, and learning activities and assessments methods depend on these intended outcomes, resulting in an appropriate balance between learning activities and evaluation.

One of the fundamental notions in CA is that the achievement of intended learning outcomes depends on a mutual responsibility between the teacher and the student. This also occurs to be the primary divergence from traditional OBE, where responsibility is placed solely on the teacher. CA on the other hand acknowledges that whilst the teacher is responsible for creating the appropriate learning environment, the actual learning is something which takes place within the individual student. The teacher may inspire and guide, but in the end the student is responsible for his or her own learning.

By considering learning a mutual responsibility between the teacher and the student, the notion of learning may be related to the previous argument that there must be an appropriate balance between the intentions of the designer and the intentions of the user if a Persuasive Design is to be successful (Figure 2).

## 2.3 Didactics in a rhetorical perspective

In the first chapter of this report it was argued that Persuasive Design may easily be linked to the field of classic and modern rhetoric, and that some rhetorical concepts could in fact be considered

essential to the perception of persuasion and to the process of designing persuasive systems. Similarly, rhetoric constitutes some of the fundamental aspects of modern teaching. As a matter of fact, the act of teaching in itself may be considered an act of persuasion.

Students who attend a lecture are to some extent persuaded to change attitude towards a subject, depending on the teacher's ability to present the subject material in an appropriate manner, and to conduct the lesson in a way which upholds the engagement and interest of the students. Kairos once again becomes a key concept as the teacher accommodates contextual changes into the planned lesson, and even the preparatory phases before the actual lecture takes place, calls for considerations concerning timing, use of location and manner in which the material is introduced.

Furthermore, rhetoric provides a solid methodological approach to preparing and performing a persuasive speech. In classical rhetoric the preparation of a speech consists of five preparatory disciplines or cannons, which each play an essential role in the aim of delivering a persuasive speech. The initial four disciplines are all related to the preparation of the speech and the material, whilst the final discipline deals with the actual performance. In order to exemplify this, the table below provides a brief description of the individual disciplines and connects them to specific actions which take place as a lesson is prepared.

<b>Rhetorical discipline</b>	<b>Preparatory phase in didactics</b>
<i>Inventio</i> is the discipline in which the material which is to be presented is gathered. This part of the cannon is not be mistaken as the act of inventing or creating material, but to be understood as the phase in which the key concepts of the speech are defined	This is the phase in which the key elements which are to be included in the lecture are localized and defined. For instance, a lecture on Persuasive Design might include not only an introduction to Fogg's approach to Persuasive Technology, but also include the human centered perspectives which were described in the previous chapter. This phase may furthermore include selecting appropriate examples to illustrate key points within the lecture.
<i>Dispositio</i> is the discipline in which the gathered material is structured so that it may be presented in the manner and order in which it is most likely to facilitate the overall persuasive goal	In terms of preparing a lecture, this would include creating the overall plan for the lesson. Considering the length of the lesson, and making sure that all key points are given enough time to be fully explained.
Elocutio refers to the appropriate and opportune manner in which the gathered and structured material is presented. It is considered the most comprehensive rhetorical disciplines, as it reflects not only upon the formulation of clear statements, but also on selecting the appropriate sound and visual illustrations to facilitate these statements. The perfect style of speech contains a maximum of clarity and efficiency.	Depending on the location of the lecture, this discipline includes the preparation of i.e. PowerPoint slides, audio equipment and general location facilitation. The discipline also includes reflections concerning a more detailed timing of the elements of the lecture, in order to ensure the constant attention of the students.
Memoria is the discipline of memorizing the prepared speech. From a rhetorical perspective it is crucial that the speech has been memorized	When teaching, memorizing the speech does not only impose credibility, it also enables the teacher to improvise during the lecture. I.e.

so that one does not simply read aloud from a manuscript. The speech must occur natural to the speaker as this founds credibility not only to the speaker, but also to the material being presented.	allowing students to ask questions and to provide elaborative examples to the material being presented. The ability to adapt the scheduled lecture in order to accommodate contextual changes is pertinent in relation to grasping Kairos and accomplishing the intended learning outcome.
Pronuntia is the final of the five cannons, and the only one which reflects directly upon the actual presentation. Pronuntia focuses on the pronunciation of the speech, the diversity in the tone of voice, use of mimic, and finally the use of body moments whilst presenting an argument.	The ability to raise ones tone of voice, while lecturing, can be a powerful way to accentuate important arguments. Use of body moment may not only help underline important points in the speech, it also helps set the mood for lecture.

When considering rhetoric in relation to the notion of constructive alignment, the five cannons may serve as a methodological approach to preparing the learning activities and material which has been selected on the basis of predefined intended learning outcomes. As such, classical rhetoric facilitates didactics with a framework for preparation of the successful lecture, and with key concepts which may inspire a deeper reflection in teachers with regards to how the teaching material is presented.

### 3. Persuasive Teaching and Learning

The previous chapters have provided introductions to part of the theoretical foundation which constitute the respective fields. This Chapter will point towards a selection of apparent cross fields between persuasion and didactics, and exemplify how the fields may facilitate each other. The first section presents some general considerations concerning the cross field, followed by a contextual description of the four PLOT work cases and examples of how the PLOT's may be targeted their specific needs.

#### 3.1 Defining the Cross Field

As described in the introduction to Persuasive Technology, Fogg defines Persuasive Technology as *“any interactive computing system design to change people’s attitudes or behaviors”* (Fogg 2003).

A Persuasive Design may as a result be considered as a design which represents an intention to motive attitude or behavioral changes, and as illustrated in the table below, some of the key concepts of Persuasive Design are also essential when creating OBE learning designs.

Persuasive Design	OBE as defined by to Biggs and Tang
<ul style="list-style-type: none"><li>• Originates from a persuasive intention</li><li>• Considers the requisites of the users</li><li>• Requires that the users is aware of the persuasive intention</li><li>• The persuasive intention is met through use of one of more persuasive strategies</li><li>• Is dependent on timing and contextual awareness</li></ul>	<ul style="list-style-type: none"><li>• Originates from an intended learning outcome</li><li>• Considers the requisite of the students</li><li>• Requires that the students are aware of the intended outcome of individual lectures and courses</li><li>• The intended learning outcome is achieved by use of rhetorical and didactic strategies.</li><li>• Is dependent on timing and contextual awareness.</li></ul>

The table provides an overview of some of the commonalities which are immediately apparent at a very general level. It is expected however that even more shared features will be identified as the work in PLOT progresses and practical experience with the design of persuasive learning objects is acquired.

Whilst defining the cross field between persuasion and didactics constitutes an important aspect of defining the concept of persuasive learning designs, the Euro PLOT project will benefit equally from considering the aspects in which persuasion and didactics distinguish themselves.

In spite of the novelty of Persuasive Design, it appears that the human centered perspective presented previously in the report, may be a valuable contribution to the field of didactics. In particular aspects of Persuasive Design may provide nuanced perspectives to teachers who aim to motivate students to actively engage in learning. Although Persuasive Design focuses on the design of interactive computer technologies, the design principles are not limited to virtual implementation. The structure of a lecture can be considered an example of the persuasive principle of tunneling, and depending on the content of the slides, teachers may include principles such as suggestion and

simulation into their presentations. Finally, the rhetorical notion of Kairos which is considered one of the key concepts within Persuasive Design may also impose more nuanced reflections concerning the timing of a lecture and the facilitation of the location.

Likewise the field of persuasive design is likely to be enriched by the perspectives on didactics which have been presented in this report. In particular the notion of CA may be related to the described necessity of ensuring an appropriate balance between the designer and the user of a Persuasive Technology, and CA may contribute with perspectives on how to establish this balance.

In the development of persuasive learning technologies, considerations concerning Kairos and the connection to Prior's A- and B-time, may be of particular relevance, as the computer mediation of learning material will greatly influence the learning experience. The introduction to classical rhetoric briefly touched upon the importance of the teacher's ability to make immediate adjustments the presentation if the context calls for it. For instance if students are struggling to understand the material presented, or opposite, if the material is too easy and the students appear to be losing interest. When teaching and learning becomes computer mediated, the means to adjust and modify are altered, and must to some extent be considered to even greater detail prior to the implementation of the learning technology. System embedded adjustments dependent on student activity, or perhaps even notions of branching time, may serve as a way to ensure the persuasive characteristics of PLOT.

Finally, the aspects on ethical evaluation which have briefly been introduced in this report are relevant not only when designing interactive technologies, but also when designing learning experiences. Considering the ethicality of the intended outcome of a lesson is a necessity regardless if the material is being mediated through a computer technology, and the acknowledgement that learning is dependent on a mutual responsibility between the teacher and the student, may be supported by the ontological approach to ethics which is introduced by Danish philosopher K.E.Løgstrup.

## 4. Contextual Case Descriptions

The contextual description of the four work cases, are based on an Inspiration Card Workshop which was held during the Euro PLOT consortium meeting on May 10<sup>th</sup> and 11<sup>th</sup> 2011.

### 4.1 Inspiration Card Workshop – Considerations and Expectations

The PLOT consortium consists of designers, developers, experts in learning and in persuasive design, as well as representatives from the four project work cases. As such, the partner group consists of both technical experts and members with little or no technical proficiency. Within the development process, this causes some classical difficulties in relation to common language and common understanding of the work process. Each work case represents different learning material and different challenges, and do as a result require individual attention and investigation if the learning designs are to comply with not only learning theory but also with the notion of persuasive technologies and persuasive design.

The aim of the workshop was to create a social context in which the individual case representatives were given the opportunity to explain and elaborate upon their individual challenges in teaching and learning, and for the additional members of the consortium to ask questions and reflect upon the different case scenarios. The general notion was to facilitate a mutual understanding between the individual partners, which was not only vital to the case oriented development of persuasive learning designs, but also essential to the previously described considerations concerning ethical as an integrated element in the design process. In accordance with Løgstrup's approach to ethical evaluation, the notion of ethics occurs as we interact, and through interaction emerges the mutual understanding and mutual responsibility which may be considered the very foundation of future ethical interactions.

The Inspiration Card Workshop was introduced by Halskov and Dalsgaard as a collaborative method for combining findings from domain studies, represented in *Domain Cards*, with sources of inspiration from applications of technology, represented in *Technology Cards*, to create new concepts for design (Halskov 2006). In 2010, the method was considered in relation to persuasive design by Davis, and proved itself to be beneficial in terms of providing the applicants with the means to define not only the desired outcomes of their designs but also the ability to discuss persuasive principles in a common language regardless of theoretical knowledge about the Persuasive Technology field (Davis 2010).

Both Halskov and Davis approaches to the workshop provides the ability to gain substantial width to the range of topics which may be discussed. However, with the overall theme of the consortium meeting being Persuasive design, and in consideration of the defined objective of PLOT (to develop persuasive technologies), it was decided to focus on a narrower and more focused version of the workshop.

With Kairos being highly contextual and a key concept in persuasive design, the domain cards were considered highly essential, yet only produced in a limited number. This was done out of concern that too many cards related to the domain would be of too much influence on the case representatives, thus oppose our overall goal of providing a context where they in their own words could explain their cases.

Contrary, the technology cards were applied as an underlying way of ensuring that the technological designs which were discussed during the workshop, all revolved around intentional and possibly persuasive designs. In order to meet this particular aim, the technology cards applied were primarily examples from the Design With Intent Toolkit, which was developed by Dan Lockton (Lockton 2008)

The DWI Toolkit is designed for direct application in development processes, as inspiration during workshops or throughout the entire process. The approach has been clearly described as work in process, which leaves room for changes and makes the toolkit highly adaptable into other defined frameworks. The toolkit consists of eight different Lenses: Architecture, Error proofing, Interaction, Ludic, Perceptual, Cognitive, Machiavellian and Security, which in total provides 101 different technology cards with inspiring visualisations, comments and questions.

The aim of the toolkit is *"to capture different worldviews on behaviour change and so allow designers to think outside the immediate frame of reference suggested by the brief (or client)"*(Lockton 2008)

As such, the lenses do not constitute superior categories, but are instead considered different perspectives on intentional design (Dinesen 2011)

The DWI toolkit itself serves as a highly applicable method to structuring workshops which are perhaps not meant to appear too organised. However, the immediate impression of the cards, were that they might in some cases be too abstract for workshop participants who are not used to being part of the actual design process, or accustomed with the terminology and functionality of interactive technologies.

As a result, the workshop held during the Euro PLOT consortium meeting, was primarily framed by the approach designed by Halskov and Dalsgaard, yet targeted towards the intended outcome of both the workshop and the consortium meeting, by applying a selection of cards from Lockton's DWI Toolkit.

The members of the consortium were divided into two groups, which each had case representatives from four cases. Supported by the inspiration cards, each of the cases were explained and discussed. Finally, as a productive and creative outcome of the workshop, each case in corporation with other members of the PLOT consortium, produced a poster which described one of the challenges they were facing, and a suggestion to its solution.

The results of the workshop are presented in the following sections.

## 4.2 DHI Group (DHI), Denmark

*“DHI is an independent international consulting and research organisation, which aims to advance technological development and competence within the fields of water, environment and health. DHI clients include: Industries, Consulting Engineers, Contractors, Infrastructure and Transportation Companies, Government Companies and Partnerships, Public Authorities, Development Organisations and Financial Institutions.*

*DHI offers a wide range of consulting services and leading edge technologies, software tools, environmental laboratories, and physical model test facilities as well as field surveys and monitoring programs. Designated as a not-for-profit organisation DHI is able to invest 25% of its human resources in research and development. Today we co-operate with universities in Denmark and abroad and are recognised globally for our innovation and expertise” (DHI 2011)*

In relation to the Euro PLOT project, DHI Group have specified their requirements in terms of a practical teaching scenario, in which case PLOT's may be a beneficial supplement to the existing types of teaching and communication. DHI Group is responsible for teaching researchers the appropriate and correct way to create new exposure scenarios, by combining existing chemical exposure scenarios from different substances.

DHI faces a challenge in terms of making vital teaching material appear relevant and motivating to the individual learners, and also in terms of designing teaching material which may facilitate different levels of difficulty.

In order to meet these challenges, it was suggested during the workshop that the DHI case might benefit greatly from different types of example simulations, as these would enable the students to gain firsthand experience with combining chemical substances, without imposing any real danger on anyone.

The workshop resulted in two specific examples of relevant simulation scenarios:

1. A disaster scenario during which the student would have to reflect upon why the disaster happened, who is responsible and what steps should have been taken to prevent the disaster.
2. A construction scenario in which the student could for instance combine appropriate chemicals to achieve an effect, or combine appropriate chemicals to minimize toxicity.

The notion of considering simulation as an approach to persuasive learning, not only incorporates elements from persuasive design (simulation is as mentioned a primary element in the functional triad), it also complies with the described notion of CA, as simulation scenarios would enable students to focus on the task they are intended to learn, rather than to concentrate on understanding the presentation of the theories behind the task.



### 4.3 Business Communication, University of Hradec Kralove

The UHK-case is primarily centred on the improvement of their long distance e-learning programmes, in the field of business-computing; e.g., information management, economics and management, and applied informatics. These courses are offered to adult students in the business sectors, whom are not using computers on a daily basis. The goal of the participation in the PLOT-project includes the improvement of their existing approach to include the persuasive design approach, introduced in this deliverable.

The main challenge of UHK is the users limited experience with working with computers. This poses a series of considerations that the PLOT-consortium must investigate and address when designing the Persuasive Learning Designs. These considerations include, but are not limited to, the level of it-averseness within the student population and the level of confidence that the students have when operating these systems.

If the students are not prone to engage in using computers on their own, due to the perceived certainty that they will fail in their task, then this issue must be addressed and improved before successful learning is likely to occur.

This challenge could be met, by amplifying the use of the persuasive principle of Simulation in Persuasive Learning Designs. This would allow students to not only read about the subject, or watch instructional videos about how to operate it-systems, but experience it in a simulation environment that would allow added help or support features. In addition, the proven persuasive effect of Reward systems, could serve as an additional reinforcement of student self-confidence.

## 4.4 Kaj Munk research Centre, Aalborg University, Demark

*“The Kaj Munk Research Center has the following main objectives:*

- 1. Securing Kaj Munk's archive for the future. The archive must be registered carefully and stored properly. At the same time, the archive is to be easily accessible.*
- 2. Digitalizing the main parts of the archive and making them accessible on the Internet.*
- 3. Promoting critical, interdisciplinary research on Kaj Munk and the society he lived in. The Center is to organize academic seminars.*
- 4. Producing and encouraging publications about Munk and the society he lived in.*
- 5. Increasing the general knowledge about Kaj Munk and the society he lived in by organizing seminars and lectures and by publishing articles.*

*After Lise Munk's death in 1998, Jean Monnet Professor, Dr. Søren Dosenrode wanted to collect and acquire Kaj Munk's archive and establish a research center. He set up a board and a support group. After several years of negotiation with Kaj Munk's heirs and the Kaj Munk Forfatterrettigheder Aps. (a private limited company holding the copyrights of Kaj Munk), Søren Dosenrode was offered the archive for the price of DKK 1,5 million (about 200,000 Euro). The board contacted several political parties about the establishment of a Kaj Munk Research Center. This resulted in an appropriation of DKK 7 million (about 940,000 Euro) from the Danish Parliament in January 2005. This amount was granted to Aalborg University for the purchase of the archive and the establishment of a research center.*

*After the purchase of the archive was completed, the archive was transported to Aalborg University in May 2005. Work at the Research Center started in June 2005, and the Research Center was officially inaugurated on August 29, 2005.” (Munk 2011).*

With regards to the Kaj Munk Research Centre, participating in the workshop help clarify that they as a case in the PLOT needed to clarify what they wanted to communicate to students, and what particular group of students they wish for the PLOT project to focus on. The research centre is involved in a number of teaching and communicative scenarios concerning both Kaj Munk himself, but also concerning the passing on of knowledge and understanding of his literary works.

Furthermore, the workshop discussion about the Kaj Munk case, inspired reflections concerning possible use of narratives in the development of persuasive learning objects, as the life and death of Kaj Munk includes a number of fascinating events which each could constitute the basis of a narrative based learning object. One example would be to let a learning object emerge from the search for knowledge about reasons why Kaj Munk was murdered. This would then lead to information about various situations during World War II, and also direct the students to the literary works of Kaj Munk.

Finally, the Kaj Munk case exemplified how persuasive learning objects may in some case benefit from being executed via mobile or even location aware systems, as several of Kaj Munk's literary works makes reference to specific physical locations in Denmark, and in particular to the area around Vedersø where Kaj Munk served as minister.

Amongst the advantages which are often mentioned in relation to learning objects, is that they enable the student to learn when they feel the most motivated to do so. This motivation within the students could be enhanced even more, if the students were located at the scene of the material presented in the learning object. For instance, the student might gain a greater understanding of the events that took place when Kaj Munk was murdered, if the learning object was executed via a mobile phone, whilst the student was located at the scene of the murder (Dinesen 2011)

The notion of considering location aware systems in the design of persuasive learning objects may be related to the described notion of Kairos, which besides from considering the appropriate time for a persuasive action to take place also includes considerations regarding the location and manner of such.

## 4.5 The Copenhagen Lutheran School of Theology

The PLOT-case of The Copenhagen Lutheran School of Theology is a Copenhagen-based school of theology and as such focuses on teaching the Lutheran doctrines and related teachings to a population of students; e.g., ancient Hebrew texts. The aim of introducing Persuasive Learning Designs to the school curriculum is to better aid the present e-learning systems that focus on a quiz-based approach to teaching the Hebrew texts.

Teachers at the school have found, that students can be roughly divided into two groups; one that aim to work in the clergy, and another that seek the challenge of learning theology for no apparent reason. For both groups, the teachers face the challenge, that the students often meet the Hebrew texts with a lack of motivation. As such, the school seeks to improve this parameter by implementing the findings from the PLOT-project.

If the motivation for learning these texts is to be improved, this challenge could be met by presenting the content in a more appealing manner. In addition, the Place and Time should be considered, as to include the three-dimensional approach to the persuasive principle of Kairos. This could be done, by relating the text to specific locations that serve as a trigger for the text to appear on e.g. a smart phone or other devices. This would allow the students to investigate the texts at a time when they are relevant in time and place, in addition to being presented in a manner that is appealing and customized to the user.

## 5. Towards D3.2

We have now presented the core concepts and the central framework in Persuasive Design and Technology, as well as given examples of how this framework can be related – at a rather general level – to theories of learning activities, as well as to the four contextual areas to which the Persuasive Learning Designs are to be applied. The current status of this document should serve as the basis for more detailed discussions among the consortium partners regarding both the theories and the practices that make up the PLOT project. These discussions are to be further elaborated and refined in deliverable 3.2. Moreover, detailed analysis of the existing tools: GLOMaker and 3ET will serve to exemplify possible strategies for developing Persuasive Learning Design.

By this, it is also said that this deliverable by no means is intended to present an exhaustive view on the theories and cases of the project. Rather, these preliminary findings are to be discussed and most likely altered and refined by bringing them to the consortium table for scrutiny.

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